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TABLES FOR THE DETERMINATION OF THE GENERA OF COCCIDÆ.

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SUBFAMILIES.

- Males with compound eyes..... 1.
Males with simple eyes..... 3.
1. Anal ring with hairs (♀)..... *Ortheziinæ*.
 Anal ring hairless (♀)..... 2.
2. Mouth-parts present in adult ♀; legs present in all
 stages..... *Monophlebinæ*.
 Mouth-parts absent in adult ♀; legs absent in intermediate stage
 of ♀..... *Margarodinæ*.
3. Abdomen of ♀ terminating in a compound segment; anal orifice
 hairless..... 4.
 Abdomen of ♀ not so terminating..... 5.
4. Insects with a scale formed entirely of secretory matter without
 admixture of the exuviae; adult ♀ retaining legs and
 antennæ..... *Conchaspinæ*.
 Insects with a scale composed partly of the exuviae; adult ♀ with-
 out legs..... *Diaspinæ*.
5. Insects enclosed in a resinous cell with three orifices; adult ♀
 apodous, with the terminal segments produced into a tail-like organ,
 bearing at the extremity the anal orifice; a prominent spinelike
 organ above the base of the caudal extension..... *Tachardiinæ*.
 Not so..... 6.
6. Females with the posterior extremity cleft; anal orifice closed above
 by a pair of triangular plates..... *Lecaniinæ*.
 Not so; triangular anal plates absent..... *Coccinæ*.

In preparing the above table, I have borrowed in places from that of Green, *Coccidæ of Ceylon*, p. 12.

ORTHEZIINÆ.†

- ♀ antennæ 8 jointed *Orthezia*, Bosc.*
 ♀ antennæ 4-jointed *Ortheziola*, Sulc.

MONOPHLEBINÆ.

- ♀ with a long posterior ovisac ; ♂ without fleshy caudal processes . . . 1.
 ♀ with conspicuous waxy lamellæ or processes more or less covering the dorsal surface, but no long ovisac ; ♂ unknown . . . *Walkeriana*, Sign.
 ♀ without a long posterior ovisac, or the lamellæ of *Walkeriana* . . . 2.
 1. Antennæ of adult ♀ 11-jointed *Icerya*, Sign
 Antennæ of adult ♀ 9-10-jointed *Proticerya*, Ckll.
 2. ♂ abdomen without long fleshy processes *Palæococcus*, Ckll.
 ♂ abdomen with long fleshy processes, usually 8 in number *Monophlebus*, Leach.

There are several other supposed genera in the books. *Crypticerya*, Ckll., is essentially an *Icerya* without an ovisac ; in the table it will fall with *Palæococcus*, but having no material of the latter genus, I am not sure whether the two are identical. *C. Townsendi*, var. *pluchæe*, has rows of waxy processes, clearly indicating an approach to the condition of *Walkeriana polei*.

Llaveia, Sign., *Ortonia*, Sign., *Protortonia*, Towns., *Guerinia*, Targ., and *Tessarobelus*, Mont., seem all to be identical with *Monophlebus*. *Drosicha*, Walk., is said to differ from *Monophlebus* by its 9-jointed antennæ, but it is doubtless an immature form of the latter genus.

The Monophlebinæ are really separable into two distinct tribes : (1) *Monophlebini*, in which the males have fleshy caudal processes, and the secretion of the females is powdery or cottony, including only *Monophlebus* ; and (2) *Iceryini*, in which the males have not the fleshy processes, and the secretion of the females is more in the form of waxy plates, including *Icerya*, *Walkeriana*, etc.

†By the characters given, *Phenacoleachia*, n. g. (type *Leachia zealandica*, Maskell, Tr. N. Z. Inst., XXIII., p. 26), will fall in this subfamily, but it has strongly Dactylopiine features. Of this *Phenacoleachia zealandica* I have males, received from Mr. Maskell, and there is a slide of the females, from the same source, in the collection of the U. S. Department of Agriculture. The female resembles that of *Dactylopius*, having two long caudal filaments as in that genus, instead of the brush of *Orthezia* ; but it has curious compound eyes consisting of ocelliform bodies forming a single ring round the head, interrupted above and below. The adult female, by its elongated form, elongated mentum, and curved spines at the end of the antennæ, resembles *Rhizococcus* ; but it differs in its 11-jointed antennæ (Maskell, l. c., Pl. VI., f. 3). The anal ring bears six stout bristles.

*An overlooked synonym of *Orthezia* is *Cyphoma*, Gistel, 1848, Nat. des Thier., p. 151. Type *O. characias*. (Not *Cyphoma*, Bolt., 1798).

MARGARODINÆ.

Tribes.

- Subterranean ; anterior legs of both sexes adapted for digging *Margarodini*.
 Arboreal ; anterior legs normal *Xylococcini*.

Margarodini.

Includes only *Margarodes*, Guilding (syn. *Porphyrophora*, Brandt.).

Xylococcini.

- ♂ with no caudal brush *Cælostoma*, Mask.
 ♂ with a caudal brush 1.
 1. Antennæ of adult ♀ 9-jointed ; temperate region of N. Hemisphere *Xylococcus*, Lw.
 Antennæ of adult ♀ 10- or 11-jointed ; Australia.. *Callipappus*, Guér.

CONCHASPINÆ.

Includes only *Conchaspis*, Ckll. *Ourococcus*, Fuller, has not been described ; but a specimen of *O. casuarinæ* received from Mr. Fuller has a good deal of resemblance, in its caudal structures, to *Conchaspis*, but is yet quite distinct from it. The ♀ *Ourococcus*, very differently from *Conchaspis*, has a long glassy tail.

COCCINÆ.

Tribes.

- Living in galls in Australia ; end of abdomen produced into a narrow tail *Brachyscelini*.
 Either not living in galls, or end of abdomen not specially modified to form a tail 1.
 1. ♀ enclosed in a complete sac of waxy or horny texture ; skin usually with figure-of-8 glands ; legs absent in adult ; larva not fringed with spines *Asterolecaniini*.
 ♀ globular or reniform, in a hard shell ; anal ring with hairs in larva, but not in adult ; larva fringed with spines *Kermesini*.
 ♀ not enclosed in a hard shell or waxy or horny sac ; or if enclosed (*Porococcus*, *Cryptoripersia*), antennæ and legs present 2.
 2. Newly-hatched larva with rows of dorsal spines *Eriococcini*.
 Newly-hatched larva without rows of dorsal spines *Dactylopiini*.

Brachyscelini.

- On *Casuarina* ; larva not fringed with spines *Frenchia*, Mask.
 On *Eucalyptus* ; larva fringed with spines, 1.

1. Legs all present, but short and unfit for use *Apiomorpha*, Rûbs.
 Hind legs only present, these long *Opisthoscelis*, Schrad.
 Legs all absent *Ascelis*, Schrad.

The genus *Cystococcus*, Fuller, has not yet been sufficiently described to be included in the tables. It forms spherical galls on *Eucalyptus*, and has neither legs nor antennæ.

Asterolecaniini.

Insect with a fringe of glassy rods *Asterolecanium*, Targ.

Insect without such a fringe 1.

1. Antennæ well-developed in adult ♀ *Lecaniodiaspis*, Targ.

Antennæ rudimentary or absent in adult ♀ 2.

2. Covering waxy ; end of abdomen strongly chitinous . . *Cerococcus*, Comst.

Covering horny ; end of abdomen not or hardly chitinous ; scale with a caudal process ending with an orifice . . . *Solenococcus*, Ckll.

(*Solenophora*, Mask.)

Covering waxy ; end of abdomen not chitinous ; scale irregular, with no caudal process *Pollinia*, Targ.

Kermesini.

Contains only one genus, *Kermes*, Boitard. By the larva, this appears to be allied to the *Eriococcini* ; whereas the larvæ of the *Asterolecaniini* show them to be allied to the *Dactylopiini*. *Kermes* has no triangular anal plates in any stage, and is not related to the *Lecaniinæ*.

Eriococcini.

Anal ring with hairs 1.

Anal ring without hairs 4.

1. Antennæ and legs absent in adult ♀ *Nidularia*, Targ.*

Antennæ and legs well formed in adult 2.

2. Adult naked to the last *Rhizococcus*, Sign.

Adult surrounded by cotton, but dorsally naked . . . *Gossyparia*, Sign.

Adult contained in a hard black scale *Porococcus*, Ckll.

Adult living in a gall on oak ; antennæ 6 jointed ; tarsi 2-jointed ; skin with figure-of-8 glands *Olliffiella*, Ckll.

Adult forming a cottony sac 3.

3. Anal ring with 8 hairs ; caudal lobes long *Eriococcus*, Targ. §

*I suppose this belongs to *Eriococcini*, but the larval characters are not sufficiently known. The adult is naked, resting on a cushion of cotton, which surrounds it, as in *Gossyparia*, from which it is distinguished by lacking legs and antennæ.

§The subgenus *Thekes*, Crawford (type *E. eucalypti*), has 7-jointed antennæ ; those of typical *Eriococcus* are 6-jointed.

- Anal ring with 6 hairs ; no caudal lobes..... *Gymnococcus*, Dougl.
4. Legs and antennæ present and well-developed in adult ; skin with grouped glands and truncate spines ; last joint of larval antenna long..... *Pseudococcus*, Westw.
(*Coccus*, Sign.)
- Antennæ present, but only one pair of legs.....5.
- Antennæ and legs absent ; not living in a gall ; newly-hatched larva with four rows of dorsal spines on each side of the middle line..... *Carpochloroides*, Ckll.
5. Only the hind legs present ; skin without grouped glands or truncate spines ; newly-hatched larva with only one complete row of dorsal spines on each side of the middle-line, but one or two other rows partially developed anteriorly..... *Capulinia*, Sign.
- Only the first pair of legs present, these very short ; living in a gall ; newly-hatched larva with two rows of dorsal spines on each side of the middle-line ; shape of adult elongate, with parallel sides, abdomen with long hairs..... *Cylindrococcus*, Mask.
- Olliffia*, Fuller, not yet described, is very close to *Eriococcus*.
- Dactylopiini.*
- Anal ring without hairs..... 1.
- Anal ring with hairs..... 2.
1. Adult ♂ with all the legs present ; first four small, hind pair very large ; margin with spines..... *Sphaerococcopsis*, Ckll.†
- Adult ♂ with the antennæ minute, conical ; legs entirely absent ; skin with many circular glands..... *Sphaerococcus*, Mask.
(Type *S. casuarinæ*, Mask.)
- Adult ♀ with the antennæ reduced to a mere tubercle ; spiracles small ; legs absent ; skin tuberculate, but without conspicuous glands..... *Phanicooccus*, Ckll.
(Type *P. Marlatti*, Ckll.)
2. With well-formed legs and antennæ in adult 3.
- Legs and antennæ absent or rudimentary in adult..... 15.
3. Antennæ 9-jointed..... 4.
- Antennæ 8- (sometimes 7-) jointed 6.
- Antennæ not more than 7-jointed 10.
4. Anal ring with 8 hairs..... *Puto*, Sign.
- Anal ring with 6 hairs 5.

†Type *S. inflatipes*, Mask., Tr. N. Z. Inst., XXV., p. 238.

5. ♀ having the aspect of a *Dactylopius* *Phenococcus*, Ckll.
 ♀ covered with waxy lamellæ, like an *Orthezia* *Ceroputo*, Sulc.
6. Insect with large projecting marginal tubercles. . . . *Tylococcus*, Newst.
 Without projecting marginal tubercles. 7.
7. Anal ring of ♀ with more than 8 hairs. *Lachnodius*, Mask.
 Anal ring of ♀ with 6 hairs. 8.
8. ♂ with four caudal filaments *Oudablis*, Sign.*
 ♂ (so far as known) with only two caudal filaments. 9.
9. Body very elongate; antennæ 8-jointed, shorter and stouter than in
Dactylopius; eyes present; mentum short. . . . *Pergandiella*, Ckll.
 (*Westwoodia*, Sign.)
 Body oval, usually with cottony tassel. *Dactylopius*, Costa.
 Body subglobular, enclosed in a cottony sac *Erium*, Crawford.
 (Type *E. globosum*.)
10. Antennæ 6- or 7-jointed; when 7-jointed, distinguished from *Dactylo-*
pius by the stouter legs and usually subterranean habitat. . . . 11,
 Antennæ 5-jointed; form elongate; anal tubercles promi-
 nent *Rhizæcus*, Kunck.
11. ♂ apterous, with relatively short antennæ *Fonscolombia*, Licht.
 (*Pseudohermes*, Nitsche; *Apterococcus*, Newst.)
 Not so 12.
12. Legs extremely thick, like crab's claws. *Pseudoripersia*, Ckll.
 Not so; legs ordinary. 13.
13. ♀ enclosed in a waxy sac *Cryptoripersia*, Ckll.
 Not so 14.
14. "Antennæ very close together" (Tinsley). . . . *Ripersiella*, Tinsley.
 (*R. rumicis* and *maritima*.)†
 Antennæ normally placed. *Ripersia*, Sign.
15. Newly-hatched larva elongate, with 6-jointed antennæ. 16.
 Newly-hatched larva oval or suboval 17.
16. Terminal antennal segment of newly-hatched larva oval, little longer
 than the one before. *Pseudolecanium*, Ckll.
 Terminal antennal segment of newly-hatched larva very large, as
 long as the three before. *Chaetococcus*, Mask.

*A genus of few species, found in Europe; when the male is unknown, the female is usually referred with safety to the large genus *Dactylopius* rather than to *Oudablis*.

†Prof. Tinsley has named this genus, and indicated its characters, in a thesis for the degree of B.S., presented to the N. M. Agricultural College, May 31, 1899. He will shortly prepare a paper describing the genus in detail.

17. Larva with 5-jointed antennæ; anal ring of adult with only 4 hairs.....*Cryptococcus*, Dougl.
 Larva with 6-jointed antennæ, joint 6 long; anal ring of adult with 6 hairs.*Antonina*, Sign.
 Larva with 7-jointed antennæ, sides very hairy; anal ring of adult and larva with 17 hairs.....*Kermicus*, Newst.

TACHARDIINÆ.

- Anal ring with numerous bristles.....*Tachardia*, Blanchard.
 Anal rings without bristles; anus furnished with two membranous lobes, the edges of which are bristly.....*Gascardia*, Targ.

(To be continued.)

THE CLOVER-ROOT MEALY BUG.

Dactylopius trifolii, Forbes.

BY R. H. PETTIT, ASSIST. ENTOMOLOGIST AGR. COLLEGE, MICH.

On July 1, 1893, the writer collected a number of mealy bugs on clover (*Trifolium pratense*) at Ithaca, N. Y. They were found at about the level of the ground between the several stems of the plant, and also on the roots under the soil. On July 17 of this year the same insect was

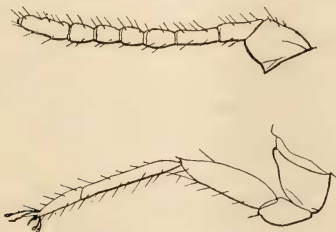


FIG. 34.—DACTYLOPIUS TRIFOLII.

found on the same plant at Agricultural College, Mich. As they were both supposed to be *D. trifolii*, Forbes, a comparison was made with the original description.*

In this description the insect is credited with having seven joints to the antennæ, and as the adult females found here and at Ithaca have eight, the male pupa was examined. This form has seven joints, and

* 14th Rep. of State Entomologist of Ill. for year 1884, by S. A. Forbes.